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On nonnegative numerical of solving integro-differential equation.

This talk discusses numerical methods for Volterra-type partial integro-differential equation of the form

$$v(x,t) = -S(x)v(x,t) + \int_x^1 K(x,y)v(y,t)dy.$$

Because of the physical background of the equation it is most desirable to construct such numerical solutions which preserve some special properties of the analytical solution (i. e. mass conservation, nonnegativity). We constructed numerical solutions by both finite difference and finite element method. The purpose of this talk is to compare them form point of view of mass conservation, nonnegativity and convergence.